INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

April 2012 examinations

Subject ST9 – Enterprise Risk Management Specialist Technical

Purpose of Examiners' Reports

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and who are using past papers as a revision aid, and also those who have previously failed the subject. The Examiners are charged by Council with examining the published syllabus. Although Examiners have access to the Core Reading, which is designed to interpret the syllabus, the Examiners are not required to examine the content of Core Reading. Notwithstanding that, the questions set, and the following comments, will generally be based on Core Reading.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report. Other valid approaches are always given appropriate credit; where there is a commonly used alternative approach, this is also noted in the report. For essay-style questions, and particularly the open-ended questions in the later subjects, this report contains all the points for which the Examiners awarded marks. This is much more than a model solution – it would be impossible to write down all the points in the report in the time allowed for the question.

T J Birse
Chairman of the Board of Examiners

July 2012

General comments on Subject ST9

The ST9 exam generally requires bullet point form or short form essay style answers that apply general principles to directly address specific circumstances. The answers given below are just one possible set of acceptable answers. Candidates are awarded marks for all reasonable answers including different but still reasonable numerical solutions. Marks are awarded for working in the case of numerical answers.

Comments on the April 2012 paper

The April paper included, relative to past papers, more mini case studies. Candidates found question 7 quite difficult because it required them to interpret historic balance sheets and income statements. Future papers may well contain questions of a similar vein. Question 8 was also a mini case study question and involved fraud and money laundering. Candidates found this question to be more straight-forward even though they were equally weighted between knowledge and application.

Well-prepared candidates scored acceptably well across the whole paper. The comments that follow the questions concentrate on areas where candidates could have improved their performance.

1 Many companies are relatively risk averse and so will be more willing to commit limited time and resource to identifying, estimating, mitigating and transferring the risks of not making the expected returns or other financial objectives. They will be interested to know that there are scenarios that result in higher than expected returns but they won't spend much time analysing them and seeking to optimise them.

For these companies the risk reporting, risk quantification including scenario testing, mitigation and transfer strategies will all be concerned with downside risk only. A possible exception is the calculation of the best case return which would be concerned with upside risk. Also the comparison of different transfer strategies may include determination of the lost potential for upside under each alternative.

However less risk adverse companies would be likely to separate and analyse upside risk in order to feed it into strategic decision-making, particularly the identification of potential opportunities to exploit.

The separation of upside and downside risk is not a useful concept for stochastic modelling and for calculating expected returns. In this case risk is typically defined as the variation from the expected result. For example, this approach is necessary to calculate confidence levels, probability of capital sufficiency and diversification credits.

The question was not handled well by most. Many candidates failed to note the two main points namely that risk adversity affects perspective and that distinguishing between upside and downside risk is, in most circumstances, not a particularly useful concept for stochastic modelling.

As ever, additional marks were given for other valid answers including:

- *Operational risk doesn't normally have any monitored upside.*
- *Regulators are usually focussed on the downside. Companies will concentrate on downside when responding to/dealing with the regulator.*

2 (i) Professional bodies ensure that their members dealing with regulatory process are thoroughly trained and their knowledge kept up to date. This is usually done through an examination system and Continuous Professional Development requirements.

Professional regulators set the standards to which the professions must adhere and monitor how well the members are doing so. They also discipline cases of non-adherence.

Industry regulators limit and monitor firms. They can control which companies can enter a particular industry and which individuals can hold particular roles. They can monitor companies by requiring standard information to be provided at frequent intervals. They can also require oversight of strategic plans, e.g. controlling the features on new products and

by interacting with senior members of a company to understand the strategic direction of a company. They can take sanctions against companies and individuals breaking the rules.

Industry bodies can require standards from member companies. However they do not carry the same weight as industry regulators and usually represent the interests of the industry.

Government can establish legislation to provide the framework for the industry regulators. This may also include the levels of capital requirements for the particular industry.

The question was handled well by most. The candidates that performed less well mostly failed to note that professional bodies regulate their members.

(ii) The government's aim will be to restore/maintain confidence in that country's banking system.

The legislation will immediately seem to meet this as it restricts exposure to the potentially riskier overseas assets.

The restriction to domestic business will also minimise the foreign exchange risk.

The legislation is also aimed to give confidence to reduce liquidity risk, i.e. to avoid account holders wanting to close their accounts in significant numbers.

However as the country is small its assets could be less marketable than the larger overseas assets which may give less favourable terms if there is a forced sale.

Conversely, the new rules could result in a surge in demand for local assets thereby negatively impacting the interest rates offered to depositors and borrowers.

The legislation does not cover interest rate risk, i.e. it could be possible to invest in securities with different terms to the accounts.

By restricting the investment choice it will force the banks to invest in similar types of asset. This would increase systemic risk as all banks would be affected if that country ran into difficulties.

The structure of multinational banks is complicated and if the country has multinational banks it will still be affected by overseas conditions.

Will add to the operational costs of banks thereby negatively impacting the interest rates offered to depositors and borrowers.

The question was handled well by most. These issues have been near the forefront of current affairs in recent years and most candidates were able to make the main points.

3 (i) Gumbel, Frank, Clayton, generalised Clayton

(ii) The main difference between the copulas is in the tail dependency.

The Gumbel copula has upper tail dependence, but no lower tail dependence and is therefore suitable for modelling dependency where association increases for extreme positive values, e.g. losses from a credit portfolio measured as a positive. Or property/liability claims aggregation.

The Frank copula has neither upper tail nor lower tail dependencies

It is therefore suitable for modelling the relationship between stock indexes and bond returns. Stocks and bonds do not usually show tail dependence because their returns are not directly dependent on each other.

The Clayton copula has heavy concentration of probability near (0,0) and depending on the parameters the Clayton copula can have either:

- Only lower tail dependency, making it suitable to use if extreme negative events are thought to happen together – for example returns from a portfolio of shares. Share market crashes of the past have demonstrated this type of behaviour.

- No upper tail or lower tail dependency – therefore similar to the Frank copula.

The generalised Clayton copula has an additional parameter which allows both upper and lower tail dependencies, and would be suitable for modelling where fat tails occur at both extreme high and low values – for example risks subject to contagion such as country credit risk.

Despite copulas being an important part of risk modelling, many candidates were unable to both describe their different properties and most likely uses. The main uses of copulas are insurance loss aggregation, default loss modelling, operational risk and market risk.

4 (i) Marine insurance is a fairly specialised form of insurance and a standardised approach is unlikely to provide an appropriate description of Endeavour's risk.

An internal model provides Endeavour with an option to develop an economic capital model that, subject to regulatory minimum standards, is tailored to its actual risk profile.

The model may also allow the company to perform more sophisticated analysis for risk management and decision-making purposes.

Endeavour may believe that the standard formula would result in an unreasonably high capital requirement, so the internal model would allow it to use capital more efficiently.

It may already have some form of economic capital model that it could use as the starting point for the internal model build.

(ii) Developing an internal model could involve the following steps:

- collect and validate data
- group or modify it if necessary
- choose the form of the model and the distributions to use
- including any copula if used
- identify and estimate all parameters and variables
- estimate any correlations between variables
- check that the goodness of fit is acceptable and attempt to fit a different model if not
- ensure that the model is able to project all required cashflows and other outputs
- including interactions between them, which may be modelled dynamically
- run the model using the selected estimated variables
- for stochastic models, this would require a large number of simulations using a random sample from the density function(s) chosen for the stochastic parameters
- output the results in an appropriate format (e.g. summarised for stochastic models)
- assess the sensitivity of results to different deterministic variable values
- perform appropriate validations on the outputs

The question was handled well by most.

The question referred specifically to Endeavour. Many answers were much too generic making little or no reference to Endeavour.

As ever, additional marks were given for other valid answers including:

- *Specify the objectives of the model, ensuring that it is consistent with Solvency II requirements.*

- *Produce thorough documentation.*

(iii) It is likely that expertise within Endeavour – or indeed the marine insurance industry – may exist which is of a qualitative nature or may not be in a sufficiently statistically credible form to meet the regulatory requirements.

However, it may be possible to use this expertise to modify or adjust the model. For example, this expertise:

- Could be used to decide whether to include / exclude outliers in the data.
- Could be used to inform the evaluation of the correlation assumptions between risks.
- Could be used to help consider alternative forms of the model.
- Could develop scenarios to assess the reasonableness of the model output.

Question 4 was intended to be a straight-forward application question. Part (iii) was not answered well by most. Some candidates appeared to not understand the term "expert judgment" and did not refer to it in their answers. Expert judgment refers to qualitative reasoning based on a persons' experience and expertise which is of course the result of both qualitative and quantitative measures. The question was about checking a model using common sense.

5 (i) An organisation's economic capital is an assessment of the capital required to cover its risks. It is the amount of capital that an organisation requires to cover its liabilities and obligations (or to maintain a particular level of solvency) under adverse outcomes, with a given degree of confidence and over a given time horizon.

VaR is a simple measure of risk, representing the maximum loss expected with a given probability (the confidence level) over a defined time horizon. A formula alternative is ok so long as the notation/variables are defined.

(ii) Assuming liabilities are held on the balance sheet at the best estimate of 3,000 (so no hidden reserves or shortfall) then capital at 99.5% = standard deviation of liabilities × 2.576 = 515.2

3,516 was also accepted being liabilities and capital.

(iii) By holding a small buffer above the regulatory capital requirement, GHI Insurance can protect itself from daily asset market volatilities and other risks materialising which may not be large enough to cause insolvency but could reduce the resources of GHI below the 1-in-200 level.

(iv) VaR @ 99.5^{th}= 515.2 (from part (ii))

VaR @ 99.999^{th} = 200 x 4.18 = 836

Assuming the tail of the economic capital distribution can be approximated linearly then

TVaR = (515.2+836)/2 = 676

A range of answers were accepted as TVAR using the formula is 578. Answers leaving the liabilities in were also accepted.

(v) The decision should take into account the costs, risks and benefits of holding additional capital:

Costs:

- An opportunity cost is incurred as the additional capital cannot be used to pursue other potentially profitable opportunities, such as…
- …writing new business
- … or entering into an acquisition

Reduced Risk of not meeting expectations/requirements:

- Additional capital reduces the risk that regulatory solvency is breached
- Additional capital reduces the risk that policyholder obligations are not met

Other benefits:

- The additional capital may bring the security of the firm into line with the risk appetite of GHI, for example…
  … shareholders may want to target a level of security higher than 1-in-200
  … shareholders may look at a longer time horizon than one year

- Additional capital may secure a higher credit rating which will lower GHI's borrowing costs, and make it more attractive to customers and analysts.
- More generally, companies with higher solvency ratios may be better perceived by the market

This question is framed around explaining capital requirements to an interested layman. It should not be assumed that the economic model and regulatory model are one and the same. The question is looking for the general reasoning of holding extra capital and the impact of doing so.

6 This is likely to be true in some cases and false in others depending upon the use of the forecast.

Generally, in order to predict more features of a time series you require more parameters. Unfortunately models with a lot of parameters have a higher chance of failing to predict accurately the most important features of the time series.

The economist is suggesting that this could be true for time series modelling and that the direction of the change, e.g. an increase or a decrease in interest rates, is more important to forecast accurately than the quantum of the change.

Of course, missing the direction means that any estimate of the amount is effectively amplified by a factor of 2 (the answer should have been +2% and not minus 2%).

Modelling the direction of the change is not likely to be sufficient for the overall forecasting model that one is trying to build. Hence, either it would be necessary to build a model forecasting both direction and amount together or forecast them separately. For example, the direction could be modelled using a time series approach and the amount of the change could be modelled separately. For example, the amount could be a random result from a distribution or the scaled result of other modelled forecasts e.g. GDP growth, inflation.

The overarching objective is to avoid over-fitting the past data and in other words to use statistics such as the AIC and BIC to find the optimal trade-off between parameters and goodness of fit.

Hence the AIC and BIC could be used to compare both say a GARCH based time series model and the alternate model based on directional time series change and a separate amount model to see which approach offered the best combination of the number of parameters and goodness of fit.

Cases to model the direction only are likely to be:

- Sparse data where trying to extract both the direction of the change and the amount of the change are not statistically credible.

- Cases where the observed past amounts of change are felt to be relatively small e.g. low interest rate environment.

- Cases where the amount of the change is felt to be random (according to some distribution).

Cases to model both direction and amount are likely to be:

- Cases where the model is intended to be mean reverting, although this could be taken account of by making the directional change mean reverting.

- Cases where there is a lot of data and the amount of the change is considered to be dependent on time.

- Cases where a relatively simplistic approach to estimating magnitude is deemed to be inappropriate because the magnitude is extremely important e.g. extreme value exercises.

The question was not handled well by most. The key part of the question was concerned with whether it is more important for a model to predict directional change or the quantum of the change. This type of consideration would be appropriate for time series forecasting such as FX rate models and interest rate models. Many answers focussed on FX rates and/or interest rates and not on the question.

7 (i) Tier 1 capital ratio equals the sum of shareholders equity and disclosed reserves divided by the sum of risk weighted assets.

Balance Sheet							
in EUR millions							
	Dec 31, 2011	Dec 31, 2010	Dec 31, 2009	Risk Weight	Risk weighted exposure		
FINANCIAL ASSETS AT AMORTISED COST							
Cash and balances with central bank	5200	4200	2000	0%	0	0	0
Due from other banks	3400	4000	4500	20%	680	800	900
Loans	14000	13700	12100	100%	14000	13700	12100
Securitised loans	1200	1200	1000	100%	1200	1200	1000
FINANCIAL ASSETS AVAILABLE FOR SALE					0	0	0
Debt investments	2300	2200	2100	100%	2300	2200	2100
FINANCIAL ASSETS HELD AT FAIR VALUE					0	0	0
Loans	2000	1800	1700	50%	1000	900	850
Residential mortgages own book	6600	3000	1400	50%	3300	1500	700
Securitised residential mortgages	11400	5300	3000	50%	5700	2650	1500
Debt investments	600	500	500	100%	600	500	500
Derivative financial assets held for trading	5000	4900	4700	100%	5000	4900	4700
Derivative financial assets used for hedging	400	400	450	100%	400	400	450
OTHER					0	0	0
Investments in associates	60	50	50	100%	60	50	50
Intangible assets	400	390	390	100%	400	390	390
Property, plant and equipment	200	180	170	100%	200	180	170
Other assets	320	300	270	100%	320	300	270
TOTAL ASSETS	53080	42120	34330	Sum of RWA	35160	29670	25680
FINANCIAL LIABILITIES AT AMORTISED COST							
Due to other banks	2300	2200	2000				
Deposits from customers	12000	7600	2500				
Own debt securities in issue	16000	14200	14000				
Debt securities in issue related to securitised mortgages	11400	6000	4100				
FINANCIAL LIABILITIES HELD AT FAIR VALUE							
Structured debt securities in issue	3400	3100	3000				
Derivative financial liabilities held for trading	5200	5200	4500				
Derivative financial liabilities used for hedging	80	100	130				
OTHER							
Employee benefits	20	41	57				
Subordinated liabilities	800	620	570				
Other liabilities	400	320	360				
TOTAL LIABILITIES	51600	39381	31217				
TOTAL SHAREHOLDERS EQUITY	1480	2739	3113				
BCBS Tier 1 Capital	**3%**	**7%**	**8%**	(SH Equity - Intangible Assets)/Sum of RWA			

The question was not handled well by most. It appears that many candidates have never calculated a bank capital ratio before.

A range of weightings between 100% and 0% were accepted. Normally government bonds and cash is 0%, mortgages 50% and the rest 100%. The capital calculation was accepted both with and without intangible assets. The capital calculation was accepted both with and without year end profit after tax.

(ii) Liquidity risk – despite increases to the absolute amounts of cash holdings, there is still a relatively low level of liquid assets (cash and cash like securities) relative to securitised loans, mortgages held, and other illiquid instruments (as illustrated by the reduction in the tier 1 capital ratio which has decreased materially from 8% to 3% as a result of the change in strategy).

4% tier 1 capital ratio is the minimum. So they have breached that.

Credit risk – the risk of default of its customers on mortgage payments, and the default of debt securities, loans to corporates or derivatives owned as assets. For example, residential mortgages own book has increased from 1,400m to 6,600m in two years and the NET residential mortgages securitised

book on balance sheet has increased from 2,000m to 10,400m in two years. The securitised mortgages held are likely to be at the highest risk tranche in the MBS securities meaning that the credit risk associated with the 10,400m will be many multiples of the credit risk associated with the 6,600m. 10,400m is 20% of total assets and 7 times total shareholders' equity. The default loss risk in the book is potentially enough to bankrupt the bank. The rating structure of the securitised mortgages on balance sheet supports this conclusion, showing that 80% of the 10,400m is rated BB or unrated. The past is not necessarily a good guide. The bank's own experience is extremely short and no guide to the future.

Market risk – mark to market valuation when assets are classed as available for trade rather than held to maturity.

The financial assets held at amortised value totalled 23,800m at 31/12/11.

The financial liabilities held at amortised value totalled 41,700m at 31/12/11.

The financial assets held at fair value or held for sale totalled 28,300m at 31/12/11.

The financial liabilities held at fair value totalled 8,680m at 31/12/11.

This represents a significant potential mismatch.

Approximately, 19,620m of net assets held at fair value (and so changing value as market conditions change) are supporting 17,900m of net liabilities which are changing according to the amortising value. A 20% decline in market value could reduce the asset side of the balance sheet by 0.2*19,620 = 3,924, which is more than twice shareholders' equity.

Interest rate risk – own debt securities and future debt issuance costs, the risk of pre-payment on the securitised mortgage loans and refinancing at lower interest rates, and re-investment risk (having to invest in lower yielding securities at maturity of a previous investment).

Interest rate term mis-match (refinancing short term debt at higher costs than the interest income from the long term mortgage loans).

Currency/FX risk: may be exposed to this as have some mortgage exposure in Germany and it is not clear the extent to which there is matching for this – although may be included in the hedging derivatives.

The question was not handled well by most. Risk managers must be able to read and understand financial data and trends.

As ever, additional marks were given for other valid answers including:

- *Property prices influence defaults*
- *Pension fund risk*
- *Increased gearing and increased volatility of profits*

(iii) Monthly review of:

- changes in the Basel I tier I ratio
- company specific tail risk events (the worst of the worst events)
- natural disaster scenarios which may affect the mortgage book (e.g. earthquake. particularly as 95% of the residences are located in the home country)
- trends in deposit taking
- trends in mortgage re-financing
- trends in pre-payment
- trends in mortgage delinquency rates
- monitor credit events
- monitor some metric of portfolio volatility (VaR, TVaR, ShockVaR, expected shortfall)
- monitor macro economic trends
- analysis of central banker's signalling at key events
- operational risks (cost money so need to set aside provision and charge margin to pricing).

Part (ii) asked for risks that one would expect to be modelled in the Bank's economic capital model. Part (iii) asked for risks that needed to be monitored by the risk manager but would not be in the model. Many candidates might have found this difficult as they appear not to have thought about risks that are monitored but not in the main model.

(iv) Banks investing in their own country's paper, which may cause pro-cyclity/wrong way risk.

The government's rating is likely an accurate guide to the relative riskiness of the mortgage borrowers. Rockfort lends predominantly in its own country meaning that the mortgages will be riskier and that the size of the aggregate deposits are more likely to be affected by economic downturns.

Mortgage lending for political goals – the country's government or central bank may artificially boost the money supply or keep interest rates artificially low to acquire approval from the electorate due to higher home ownership rates.

Owning country's own government bonds will not be risk free and likely to be risk weighted at non-zero by the Eurozone regulators and rating agencies. In any event they are not economically risk free.

Many candidates' answers were very similar to the suggested solution.

(v) Increase cash holdings with the central bank, although this will come at an opportunity cost of foregone income.

Reduce the short term due monies from other banks (in case of sudden insolvencies or delay in recovery).

Invest in government treasuries and government backed bonds – provided the government is highly rated (e.g. would not be the case under the circumstances in part (iv)).

Reduce exposure to complex structured finance products which may be difficult to sell or suffer large mark to market write downs if investor sentiment turns.

If it were possible to match the term structure of the 28,000m customer deposits plus own debt securities with the term structure of the 16,000m loans and 6,600m residential mortgages then the liquidity risk would substantially reduce.

Where matching is not possible then seek to extend the term structure of the unmatched element of the own debt securities in order to reduce repayment risk and in effect push the liquidity risk out further in the time horizon.

Maintain a term matched book on the derivatives held for trading. The derivatives held for hedging are not intended to be liquidated prior to expiry of the underlying asset/liability. So the term structure of these derivatives should be included with the physical asset/liability term structure calculation.

Increase withdrawal notice terms on deposit accounts

Set up an emergency/contingency funding arrangement

All candidates gave some credible answers. Most made the asset liability matching point and the point about increasing the liquidity in the investments.

(vi) <u>Threefold increase in residential mortgage defaults</u>

The impact will be a combination of:

- The current default losses. It is not possible to be precise because the current cost of default losses is not explicitly shown. The impairment of financial assets item may include some anticipated write down in the mortgages but it is unlikely.

- Future growth in own book net position over the next three years. Potential for continued growth over next three years is likely to be lower as the tier 1 capital is already below 4% and so the bank will either need to raise new capital or replace existing corporate loans with residential mortgage loans in order to increase residential mortgages on its own book.

- The degree to which the default losses on the net securitised residential mortgages are worse because the bank retains the riskier tranches.

- Bank likely to increase mortgage rates to compensate.

The key items on the balance sheet are:

- Asset: residential mortgages own book 6,600, 3,000, 1,400

- Asset: securitised residential mortgages 11,400, 5,300, 3,000

- Liability: debt securities in issue related to securitised mortgages 1,000, 1,000, 1,000

For example,

6,600 with likely current default losses of say 0.5%

10,400 with likely current default losses of say 1.5%

Impact is an increase in annual default losses of say 6,600*1.5% +10,400*4.5% equals 567 per annum

Current pre-tax profits are less than 100 implying it will likely be very difficult for the bank to continue to be profitable if the residential mortgage default losses triple.

<u>A dramatic fall in investment yields</u>

The impact will depend upon:

- The market value of net fixed interest investments held at fair value should increase. Financial assets and liabilities held at amortised value/cost are potentially not impacted.

- The ability of the bank to invest in new securities/loans/mortgages at a net profit compared with its borrowing costs from government, other banks, depositors. This should be possible. In particular the depositors may have no choice but to accept lower interest rates and the bank may not have to reduce the mortgage rate by the same amount.

- Growth may be impacted. The fall in yield may increase economic growth and inflation and in turn increase the bank's profitability.

Overall the impact is likely to be positive for the bank.

This was a difficult question that most candidates found difficult. The suggested solution is just one of many. Risk managers must be able to think about the likely effects of a wide range of different probable and improbable scenarios.

(vii) Lack of experience and expertise in retail banking. The bank has gone from a corporate bank to a bank focussed on retail customers and mortgages in two years. It has no experience of managing this type of business. The family member owners have no experience.

The lack of experience and systems in new areas could make it susceptible to fraud both from internal and external sources.

The personnel expenses have gone from 90m to 140m in two years. Employee benefits carried on the balance sheets have fallen from 57 to 20. The bank is likely to have many more and lower paid staff than in the past.

The total assets have risen by 55% to 53,080m and yet pre tax profits are trending flat or down at 98m in 2011 or only 6% of the much reduced shareholders' equity.

The bank is a small bank which is much more highly leveraged than before and focussed on new products and customers. Its biggest operational risk is that its inexperienced management makes a mistake.

The main operational risk should have been obvious and most candidates got it although many failed to "explain" the consequences of the risk to the bank.

8 (i) Agency risk – principal shareholders may be family (via trusts), and therefore management could be working in their interest (personal enrichment) rather than legitimate public shareholders (long term growth and sustainability).

The use of trusts to disguise majority shareholders may be a tactic to conceal evidence of cartel behaviour and monopolistic business practices in a poorly regulated industry.

Large dividends from unknown sources: the moneys might be the proceeds of crime. Even if legitimate, the analysts will have no way of forecasting future moneys from these sources in the future.

Financial movements to non-core or unaffiliated companies are also suggestive of:

(1) being support for business ventures held by family or associates and also not aligned with the interests of legitimate public shareholders.

(2) financing their acquisitions with large and unsustainable debt rather than organic growth, or hiding debt and losses via derivative financing (such as selling credit linked notes on itself)

(3) money-laundering

(4) potentially high concentration of counterparty risk

The lack of data on profit margins makes it impossible to verify cashflow accounting and balance sheet statistics, making manipulation of profit reporting straightforward.

Large volumes of cash through door to door sales make auditing of actual cashflow difficult (lack of invoicing etc.).

Use of a small firm of auditors suggests a lack of adequate independence. Examples would be if Happy Cow is their only client, or if there is complicit cooperation in fraudulent behaviour (securities fraud, aiding and abetting, filing false audited accounts) – e.g. Friehling & Horowitz CPAs.

Happy Cow may well be in breach of stock market rules by not divulging details of its management or board, which are in place specifically to maintain good corporate governance via separation of the two functions. It may well be that Happy Cow's Chairman and CEO were the same person, or that the CFO or chief auditor/accountant was a relative.

The question was handled well by most. Most candidates made valid points on each of the seven analysts' concerns.

(ii) Almost certainly a whistleblower contacted the police. For example, an ex-insider, current insider, the auditors or a bank officer used in the chain of cash movements suspecting money-laundering.

At this point the police were likely told something about cash not being fully accounted for in the accounts either as it leaves the company or more likely as it enters the company. For example much more cash could be coming in than could possibly have been received from door to door sales.

Alternatively, police might have caught some criminals elsewhere in the chain and been able to work out that Happy Cow might be involved.

Investigative journalism might have uncovered sufficient evidence to report it to the police. This could have been initiated by concerned analysts.

The regulator may have discovered the offenses. For example, the regulator might have conducted an inspection of records during a visit.

The question was handled well by most.

(iii) Money laundering – Cash from the door to door sales could disguise other cash brought into the company from criminal sources. Cash movements to and from the associates could launder the dirty money back into clean money.

Fraudulent accounting/reporting to the stock exchange – The cash was not being accurately reported. Hence much of the accounts would have been manufactured in order to represent the company as profitable and growing so that it could borrow more money from lenders and raise more money on the

stock exchange. This was probably done with the ultimate objective of stealing much of this money as well, i.e. embezzlement.

The embezzlement would have been relatively straightforward given the unconsolidated associates and other third party companies. Also the small firm of auditors would have not had the expertise or resources to unpick the embezzlement.

Tax evasion would have inevitably occurred as the cash was not being reported and many of the transactions between the other associates and third parties were likely to have been falsely reported.

The question was handled well by most.

As ever, additional marks were given for other valid answers including:

- *bribery*
- *price fixing*

(iv) All of the following will depend on the particular country. Most countries are likely to have the following types of rules and regulations:

Corporations Act – Talks about limited liability, only trading whilst solvent, filing accurate financial accounts, fit and proper directors.

Money Laundering – full knowledge of the legitimate sources of all cash received.

Fraud & Embezzlement – Criminal law. penalties include fines and imprisonment.

Corporate Governance Code of Practice – make up of the board, independent directors, independent audit and remuneration committees. Non-exec directors having unfettered rights to review documents.

Compliance Committee – ensures that the company complies with all relevant legislation, regulations, codes of practice.

Audit Committee – receives the external audit report and discusses all of the issues arising to report back to the board. *(An alternate response based on accounting standards is fine)*

Stock exchange listing rules – numbers and reports which have been independently audited are given to external experts to review.

(v) Introduce legislation to stop the cash sale of dairy products. Governments can lose a lot of tax revenues due to the black market of trading for cash. Also cash based businesses are the main sources of money launderers. Hence the government might be willing to do something like this as a part of trying to reduce the cash market.

Government takes full control of milk sales. Probably not workable but if Happy Cow controls the majority of the market anyway the Government could take it over until it could clean it up and re-list it on the stock exchange.

The question was not handled well by most. The question required two laws that might appear reasonable but would likely prove onerous to the economy. Some candidates suggested changes that did not involve the passing of new laws. Some candidates suggested new laws that were not relevant to the situation.

END OF EXAMINERS' REPORT